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ON THE PHARMACOLOGICAL INFLUENCE OF THE KIDNEY FUNCTION

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The author discusses the rate of excretion of fluids by the kidney in terms of several parameters. He states that the diuretic action of Atophan is exerted renally and not extra-renally as is the case with most other drugs.

Author

Earlier investigations of the effect of Atophan and calcium salts on /II epinephrine glycosuria had revealed, among other facts, that diuresis accompanying epinephrine glycosuria may be greatly intensified by Atophan. This appeared remarkable in that Atophan alone is not a diuretic. The sugar excretion itself did not prove to be responsible for the rise in diuresis, for it was possible to show a similar effect when an increased amount of fluid was sup- /III plied to the organism in another way, under specific conditions.

Analysis of this effect next required an investigation of the excretion of the fluids supplied to the organism. It was found that excretion of the fluid supplied depends upon the following: 1. the amount and distribution of the supply, 2. the qualitative composition of the supply, and 3. the route of administration of the supplied fluid.

Subsequent investigation showed that the amount of urine excreted is not necessarily proportionate to the amount of water uptake. The statement that water supplied in drinks or water-rich food dilutes the blood and is excreted in the course of 6-7 hours, which is supported by the so-called water-test, is of only limited validity according to its dependence on the above three points. Thus 1 liter of tap water, for example, drunk by a fasting person is excreted in 6-7 hours, but this is not the case with 1 liter of Ringer solution or common salt solution. In addition, the investigation revealed that kidney func-

/Numbers in the margin indicate pagination in the original foreign text.

tion is, within certain limits, independent of the amount of fluid supplied, since under special conditions, the fluid supplied can be stored in the tissues and the kidney can draw on this source at times of decreased fluid uptake to maintain smoothly operating function. Only during a sudden flooding of the system with water, as is the case with the water-test, is the kidney function changed so as to initiate increased activity per unit time. Whether a substitutive state of equilibrium exists between kidney activity and other water excretion (perspiration and respiration) can only be decided by a balance.

An isotonic solution may easily become stored water, but not hypotonic or hypertonic solutions which are rapidly excreted. Further, subcutaneously injected isotonic fluid remains longer as stored water than that supplied orally or intravenously to the system.

On further consideration of the above mentioned data, the action noted for Atophan is seen to be effected, in contrast to the case of other diuretics, through renal and not through extrarenal factors. The tissue water is not itself affected, and for this reason this effect does not become manifest if the organism is water-rich as it is, for example, in an edematous state. However, the effects of other diuretics which supply stored water to the kidney, can be continuously supported in their functioning by it.

Excretion of uric acid and acetone are simultaneously promoted by Atophan while chlorides are excreted in increased amounts only relative to the extent of diuresis.

A similar action affecting induced diuresis can also be observed with narcotics in the first stage of their action.

The causes of these effects can be taken to be on the one hand, a direct action on the secreting element, and on the other hand, a paralysis of the

limiting nerves (sympathetic system paralysis). This question still remains to be decided.

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